

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

- 1-2. (Canceled)

3. (Previously Presented) A motor drive apparatus comprising:

a first drive circuit driving a first motor;

a voltage converter performing a voltage conversion between a power supply and said first drive circuit; and

a capacitor provided between said voltage converter and said first drive circuit;

a control device for controlling said first drive circuit and said voltage converter,

wherein

said voltage converter performs a voltage step-up operation of stepping up a power supply voltage to an arbitrary level and outputs the stepped-up voltage, and

said first drive circuit starts an electric power conversion for driving said first motor in powering mode after said voltage step-up operation is completed-completed, and

said control device includes:

a target voltage determination unit for determining a target voltage of said stepped-up voltage based on the number of revolutions of said first motor;

a voltage conversion control unit receiving the target voltage determined by said target voltage determination unit for controlling said voltage converter such that said stepped-up voltage is equal to said target voltage;

_____ a determination unit for determining whether or not said stepped-up voltage reaches said target voltage and, when said determination unit determines that said stepped-up

voltage reaches said target voltage, generating a signal indicating completion of the voltage step-up operation; and

an electric power conversion control unit for causing said first drive circuit to start an electric power conversion for converting said stepped-up voltage into a drive voltage for said first motor, when said electric power conversion control unit receives said generated signal from said determination unit.

4. (Previously Presented) The motor drive apparatus according to claim 3, wherein

said first drive circuit receives, after said voltage step-up operation is completed, a required power of said first motor and starts to drive said first motor in powering mode.

5. (Previously Presented) The motor drive apparatus according to claim 4, wherein

said first drive circuit holds in advance a relation between temperature of said power supply and an electric power level that can be output from said power supply, and determines a timing at which said first motor is started to be driven,

based on the temperature of said power supply.

6. (Previously Presented) The motor drive apparatus according to claim 5, wherein

when the temperature of said power supply is lower than a first predetermined threshold or the temperature of said power supply is higher than a second predetermined threshold, said first drive circuit receives the required power of said first motor after said voltage step-up operation is completed, and starts to drive said first motor in powering mode.

7. (Previously Presented) The motor drive apparatus according to claim 6, wherein

a predetermined delay time is provided between a timing at which said voltage step-up operation is completed and a timing at which said first drive circuit starts to drive.

8. (Currently Amended) The motor drive apparatus according to any of claim 3, wherein

said first motor is a motor starting or stopping an internal combustion ~~engine~~, engine, and

said voltage converter starts said voltage step-up operation when an instruction to start said internal combustion engine is output.

9. (Currently Amended) The motor drive apparatus according to claim 8, ~~further comprising:~~ wherein

~~target voltage determination means for determining a target voltage of said stepped-up voltage based on the number of revolutions of said first motor ; and~~

~~— voltage conversion control means receiving the target voltage determined by said target voltage determination means for controlling said voltage converter to set said stepped-up voltage to said target voltage, wherein~~

receiving said instruction to start said internal combustion engine, said voltage conversion control ~~means~~ unit controls said voltage converter to obtain a predetermined stepped-up voltage that is necessary for starting said internal combustion engine, regardless of said determined target voltage.

10. (Original) The motor drive apparatus according to claim 9, wherein said predetermined stepped-up voltage is a maximum voltage of said motor drive apparatus.

11. (Currently Amended) The motor drive apparatus according to claim 10, wherein

said voltage conversion control ~~means-unit~~ determines a voltage step-up rate so that electric power required for said voltage step-up operation is within the electric power level that can be output from said power supply, and said power supply voltage is stepped up to said predetermined stepped-up voltage at said determined voltage step-up rate.

12. (Currently Amended) The motor drive apparatus according to claim 11, wherein

said voltage conversion control ~~means-unit~~ holds in advance a relation between temperature of said power supply and the electric power level that can be output from said power supply, and determines said voltage step-up rate based on the temperature of said power supply.

13. (Currently Amended) The motor drive apparatus according to claim 9, further comprising a second drive circuit provided in parallel with said first drive circuit, and receiving said stepped-up voltage to drive a second motor, wherein

said target voltage determination ~~means-unit~~ determines said target voltage based on the number of revolutions of said first motor or said second motor, and

when said second motor drives a vehicle and an instruction to start said internal combustion engine is issued, said voltage conversion control ~~means-unit~~ controls said voltage converter to obtain said predetermined stepped-up voltage before said internal combustion engine is started.

14. (Original) The motor drive apparatus according to claim 13, wherein said predetermined stepped-up voltage is a maximum voltage of said motor drive apparatus.

15. (Currently Amended) The motor drive apparatus according to claim 14, wherein

said voltage conversion control ~~means-unit~~ determines a voltage step-up rate so that electric power required for said voltage step-up operation is within the electric power level that can be output from said power supply, and steps up said power supply voltage at said determined voltage step-up rate to said predetermined stepped-up voltage.

16. (Currently Amended) The motor drive apparatus according to claim 15, wherein

said voltage conversion control ~~means-unit~~ holds in advance a relation between temperature of said power supply and the electric power level that can be output from said power supply, and determines said voltage step-up rate based on the temperature of said power supply.

17. (Canceled)

18. (Currently Amended) A motor drive apparatus comprising:

a first drive circuit driving a first motor;

a voltage converter performing a voltage conversion between a power supply and said first drive circuit; and

a capacitor provided between said voltage converter and said first drive circuit, ~~wherein~~ incircuit; and

a control device for controlling said first drive circuit and said voltage converter,
wherein

said voltage converter starts a voltage step-down operation for stepping down a voltage supplied from said first drive circuit after said first drive circuit drives said first motor in regenerative mode and stops said first ~~motor~~ motor, and

said control device includes:

an electric power conversion control unit for controlling said first drive circuit
such that said first motor is driven in said regenerative mode;

a target voltage determination unit for determining a target voltage of an output voltage of said voltage converter, based on the number of revolutions of said first motor; and

a voltage conversion control unit receiving the target voltage determined by said target voltage determination unit and generating a signal for controlling said voltage converter such that said output voltage is equal to said target voltage; and

said voltage conversion control unit outputs said generated signal to said voltage converter after said first motor is stopped.

19. (Previously Presented) The motor drive apparatus according to claim 18, wherein

said voltage converter holds in advance a relation between temperature of said power supply and an electric power level that can be input to said power supply, and determines a timing at which said voltage step-down operation is started, based on the temperature of said power supply.

20. (Previously Presented) The motor drive apparatus according to claim 19, wherein

when the temperature of said power supply is lower than a first predetermined threshold or higher than a second predetermined threshold, said first drive circuit starts said voltage step-down operation after stopping said first motor.

21. (Previously Presented) The motor drive apparatus according to claim 20, wherein

a predetermined delay time is provided between a timing at which said first motor is stopped and a timing at which said voltage step-down operation is started.

22. (Currently Amended) ~~A motor drive apparatus comprising:~~
~~— a first drive circuit driving a first motor; and~~

~~_____ a voltage converter performing a voltage conversion between a power supply and said first drive circuit, wherein~~

~~_____ under the condition that electric power that is output from said power supply and that undergoes the voltage conversion by said voltage converter is provided to and from between said first drive circuit and said first motor for driving said first motor and the condition that said first motor is started to be driven, said first drive circuit starts to drive said first motor at a timing different from a timing at which said voltage converter starts the voltage conversion, wherein~~

~~_____ after said first drive circuit starts to drive said first motor in regenerative mode, said voltage converter starts a voltage step-down operation. The motor drive apparatus according to claim 18, wherein~~

~~_____ said first motor is a motor starting or stopping an internal combustion engine,~~

~~_____ when an instruction to stop said internal combustion engine is output, said first drive circuit starts to drive said first motor in said regenerative mode, and~~

~~_____ said voltage converter starts said voltage step-down operation in response to completion of the stoppage of said internal combustion engine.~~

23. (Currently Amended) The motor drive apparatus according to claim 22, wherein

in response to the stoppage of said internal combustion ~~engine, engine,~~ said voltage conversion control ~~means-unit~~ determines a voltage step-down rate so that electric power generated by said voltage step-down operation is within an electric power level that can be input to said power supply, and controls said voltage converter to obtain said target voltage at said determined voltage step-down rate.

24. (Currently Amended) The motor drive apparatus according to claim 23, wherein

said voltage conversion control ~~means-unit~~ holds in advance a relation between temperature of said power supply and the electric power level that can be input to said power supply, and determines said voltage step-down rate based on the temperature of said power supply.

25. (Currently Amended) The motor drive apparatus according to claim 22, further comprising a second drive circuit provided in parallel with said first drive circuit and receiving said output voltage to drive a second motor, wherein

said target voltage determination ~~means-unit~~ determines said target voltage based on the number of revolutions of said first motor or said second ~~motor~~, motor, and

when said second motor drives a vehicle and an instruction to stop said internal combustion engine is issued, said voltage conversion control ~~means-unit~~ controls said voltage converter to obtain said target voltage after said internal combustion engine is stopped.

REMARKS

Claims 3-16 and 18-25 are pending in this application. By this Amendment, claims 3, 8, 9, 11-13, 15, 16, 18 and 22-25 are amended. No new matter is added by these amendments. Reconsideration based on the amendments and following remarks is respectfully requested.

I. Allowable Subject Matter

Applicant greatly appreciates the indication in the Office Action that claims 5-7, 11, 12, 15, 16, 19-21, 23 and 24 recite allowable subject matter. However, Applicant respectfully asserts that all of the claims are in allowable condition.

II. The Claims Define Allowable Subject Matter

The Office Action rejects claims 3, 4, 8-10, 13, 14, 18, 22 and 25 under 35 U.S.C. §102(e) as being anticipated by Nakamura et al. (U.S. Patent Application Publication No. 2004/0145338). The rejection is respectfully traversed.

The Office Action asserts that Nakamura teaches, among other things, "said first drive circuit starts an electric power conversion for driving said motor in powering mode after said voltage step-up operation is completed" as recited in claim 3. Applicant disagrees. Specifically, claim 3 as amended recites a "control device" that determines whether or not the output voltage of the voltage converter has reached a target voltage while the voltage step-up operation is performed. When the control device determines that the output voltage has reached the target voltage, the control device accordingly determines that the voltage step-up operation has been completed. Then, the control device causes the first drive circuit to start electric power conversion. In other words, "completion of the voltage step-up operation" in a subject application means that the output voltage of the voltage converter has reached a target voltage, and thus does not mean completion of charging of capacitors indicated by the

Action. Accordingly, withdrawal of the rejection of claims 3 and claims depending from claim 3 over Nakamura is respectfully requested.

The Office Action also asserts that Nakamura teaches all of the currently claimed combination of features of claim 18 and claims depending therefrom. Applicant respectfully disagrees. Specifically, claim 18 as amended specifies a control configuration for inputting the feature "said voltage converter starts a voltage step-down operation for stepping down a voltage supplied from said first drive circuit after said first drive circuit drives said first motor in regenerative mode and stops said first motor". The "control device" recited in claim 18 is configured to generate a signal for controlling the voltage converter based on a target voltage and output the generated signal to the voltage converter after the first motor is stopped.

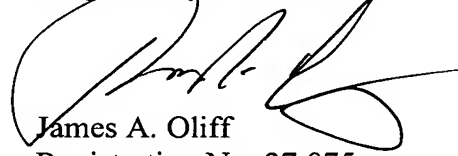
Nakamura fails to teach such a configuration. Accordingly, withdrawal of the rejection of claims 18 and claims depending therefrom 18 is respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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JAO:RAC/amt

Attachments:

Request for Continued Examination
Petition for Extension of Time

Date: May 29, 2009

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